SABE

(Society for Automation in Business Education)

DATA PROCESSOR

FOR BETTER BUSINESS EDUCATION

Volume 1, Number 3, March 1961

AUTOMATION REFERENCE AND RESEARCH

Automation reference and research listings constitute one of the most important activities of the Society for Automation in Business Education. The Editors urge your cooperation in making our listings valuable and useful; send information to the Society so that it can be made available to all our members.

AUTOMATION RESEARCH

The Society is endeavoring to gather and publish the most comprehensive listing of automation theses and dissertations in existence. You can help by sending the Editors listings, corrections, or other useful information concerning graduate research either completed or in progress. If you are teaching in a college or university, or if you are located near a college or university library, please take the time to go and make us a list of all theses and dissertations on automation which have been completed. In addition, please try to find out whether any graduate work is in progress. When research is listed in the SABE DATA PROCESSOR as "under way," why not send help to the person doing the research if you have any material of possible value.

Donald K. Abe, DATA FOR MANAGERIAL CONTROL. Doctorate, (under way), University of California, Berkeley, 1960.

Samuel Ananian, PUNCHED CARD ACCOUNTING. Masters, New York University, 1959.

Shelden Auerback, A DATA PROCESSING SYSTEM FOR A SMALL COMPANY. Masters, Los Angeles State College, 1959.

Kenneth G. Bash, ELECTRONIC DATA PROCESSING AND ITS EFFECT UPON THE PUBLIC ACCOUNTANT'S AUDIT. Masters, University of Pennsylvania, 1959.

Charles P. Bonini, ACCOUNTING SYSTEMS AND INFORMATION FLOWS. Doctorate, (under way), Carnegie Institute of Technology, 1959.

James B. Bower, PRINCIPLES OF ACCOUNTING SYSTEMS DESIGN. Doctorate, University of Texas, 1959.

Joseph M. Buckheit, THE ROLE ASSIGNED TO MEMBERS OF CPA FIRMS IN THE INSTALLATION OF ELECTRONIC DATA PROCESSING SYSTEMS. Masters, University of Pennsylvania, 1959.

Wilfred V. Candler, LINEAR PROGRAMMING WITH STOCHASTIC YIELDS. Ph.D., Iowa (Ames), 1957.

A. Charnes and W. W. Cooper, THE THEORY AND COMPUTATION OF DELEGATION MODELS. Faculty Research, Carnegie Institute of Technology and Northwestern University.

A. Charnes, W. W. Cooper and M. H. Miller, MATHEMATICAL MODELS FOR COSTING FUNDS AND EVALUATING RISK. Faculty Research, Carnegie Institute of Technology and Northwestern University.

G. P. Clarkson and A. H. Meltzer, AN HEURISTIC APPROACH TO PORTFOLIO SELECTION. Faculty Research, Carnegie Institute of Technology, 1959.

Paul R. Cone, HOW DOES MANAGEMENT DECIDE WHAT ACCOUNTING DATA IT NEEDS? Doctorate, University of Southern California, 1959.

William Burford Cook, THE EFFECTS OF MECHANIZATION OF THE OFFICE WORKER. MBA, University of California, Berkeley, 1956.

James H. Curry, ANALYSIS OF THE FEASIBILITY AND SELECTION FACTORS OF MACHINE ACCOUNTING EQUIPMENT UTILIZATION IN THE SMALL BUSINESS. Masters, University of Pennsylvania, 1959.

Ralph Day, APPLICATIONS OF LINEAR PROGRAMMING TO MARKETING. Doctorate, (under way), North Carolina, 1960.

Marcus Eisendorf, ELECTRONIC DATA PROCESSING AND THE POTENTIALS FOR ITS USE IN A MEDIUM-SIZED TEXTILE MILL. Masters, New York University, 1959.

C. Orville Elliott, AN INVESTIGATION INTO THE APPLICATION OF ACCOUNTING FUNCTIONS IN ELECTRO-MECHANICAL AND ELECTRONIC DATA PROCESSING SYSTEMS. Faculty Research, North Texas State College, 1959.

Mary Louise Forney, OFFICE MACHINES IN USE AND TYPES OF TRAINING RECEIVED BY MACHINE OPERATORS IN LINCOLN, NEBRASKA, WITH IMPLICATIONS FOR TEACHER TRAINING. M.Ed., University of Nebraska, 1958, 125 pages.

James B. Foxworth, THE IMPACT OF ELECTRONIC COMPUTERS ON MANAGEMENT PROCESSES: CASE STUDIES IN THREE LEADING COMPANIES. Doctorate, Columbia University, 1959.

M. Adele Frisbie, DATA PROCESSING EQUIPMENT, RELATED OFFICE MACHINES AND TRENDS IN OFFICE EMPLOYMENT 1932-1957. Ph.D., (under way), New York University.

Eli Garcia, INTEGRATED INSTALLATION ACCOUNTING FOR THE DEPARTMENT OF ARMY. Masters, New York University, 1958.

Leonard J. Garrett, INFORMATION SYSTEMS AND MANAGERIAL DECISION MAKING AND CONTROL. Doctorate, (under way), Pennsylvania, 1960.

Earl Lowell Gordon, DATA PROCESSING THROUGH ELECTRONICS; A STUDY OF THE ELECTRONIC COMPUTER. Masters, Roosevelt University, 1959.

Richard Gosa, ELECTRONIC DATA PROCESSING AND THE AUDITOR. Masters, Drexel Institute of Technology, 1959.

Jay R. Greene, USE OF GENERAL PURPOSE ELECTRONIC COMPUTERS IN THE SOLUTION OF MARKETING PROBLEMS. Doctorate, (under way), Ohio State, 1958.

Marvin Griffin, OPERATIONS RESEARCH AND BUDGETING. Doctorate, (under way), Johns Hopkins University, 1959.

Paul B. Henderson, THEORY OF DATA SYSTEMS FOR ECONOMIC DECISIONS. Ph.D., Massachusetts Institute of Technology, 1960.

Herbert G. Hicks, THE QUANTIFICATION OF MANAGERIAL DECISION PROBLEMS. Doctorate, (under way), Alabama, 1960.

Thomas P. Hitchcock, CLERICAL APPLICATIONS OF DIGITAL COMPUTERS. MBA, University of California, Berkeley, 1954.

William J. Horne, THE ECONOMIC ASPECTS OF ELECTRONIC COMPUTERS. Doctorate, (under way), Boston College, 1960.

Author E. Hughes, ELECTRONIC DATA PROCESSING: ITS ECONOMIC AND SOCIAL EFFECTS UPON OFFICE MANAGEMENT. Ph.D., (under way), State University of Iowa.

James Jacobs, A MECHANICAL SYSTEM FOR THE RETRIEVAL OF TECHNICAL INFORMATION. M.S., University of Tennessee, 1959.

Jack Josephs, MECHANIZATION IN THE ACCOUNTING DEPARTMENT OF A MANUFACTURING CONCERN. Masters, City College of New York, 1959.

Harold Katz, THE EFFECTS OF ELECTRONIC DATA PROCESSING INNOVATIONS ON DISECONOMIES OF MANAGEMENT AND OPTIMUM SIZE OF FIRMS. Doctorate, (under way), Columbia, 1960.

Felix Kaufman, THE EFFECT OF ELECTRONIC DATA PROCESSING ON AUDIT CONDITIONS. Doctorate, (under way), Chicago, 1959.

Dale T. Kidd, AUTOMATIC COMPUTERS IN PUBLIC UTILITY ACCOUNTING. Masters, University of Pennsylvania, 1959.

Mary Catherine Laughlin, THE SECONDARY PROGRAM FOR PREPARING INTEGRATED DATA PROCESSING AND ELECTRONIC DATA PROCESSING WORKERS IN CITIES OVER 100,000. M.A., (under way), University of Minnesota.

Rose Ellen Lewis, EVALUATING TRANSCRIBERS ON THE JOB, A STUDY MADE IN THE MADISON, WISCONSIN, AREA. M.S., University of Wisconsin, 1958, 47 pages.

J. Peter McNerney, DATA PROCESSING FOR MANUFACTURING FIRMS. Doctorate, Harvard University, 1959.

Lawrence P. Maher, TEMEFAM: A NEW SAMPLING SYSTEM DEVELOPED ESPECIALLY FOR AUDITING. Masters, University of Texas, 1959.

WORTH READING

Services

In each issue one service, similar to the one below, will be previewed in detail for your information--next month: Berkeley Enterprises, Inc.

The primary function of CANNING, SISSON AND ASSOCIATES, INC., is to publish information about industrial and business uses of electronic data processing. This service began in 1955 when the firm found itself (acting primarily as a consultant) swamped by the quantities of published information in the field, with little time to read it all, and even less time to search back for information they remembered having seen.

DATA PROCESSING DIGEST was born to answer this need. For the past six years an average of 125 periodicals, most of the books published on EDP and related subjects, and countless conference proceedings, pamphlets, reports, and privately submitted papers, were reviewed. Continuous gleaning of the best written, the most provocative, informative, timely, and helpful material is the rule. Sometimes the material is digested, sometimes abstracted, sometimes critically reviewed. When a

trend or a situation is seen to be developing that appears to be worth commenting on, an original article pointing it out is written; this is contained in the Comment section of the DIGEST.

Once a year, usually in February or March, a list of recommended reading material is published, composed of what is felt to represent the best in books and articles on each subject over the past few years. As new materials are written which update or make obsolete old ones, they are substituted for the old ones on the list.

Late in 1959 it was discovered that it was getting increasingly difficult to look back over the old issues to find material pertinent to a particular subject. Twelve issues of each year were being searched, and even with the help of the yearly index, this was a chore. So the EDP IDEA FINDER was devised--a way of indexing the contents functionally by interest areas, and in logical sequence. This makes it possible, for instance, for a company just beginning a study of EDP, to find all the introductory articles, then all the articles on planning for an EDP system, then all the articles on designing, programing, installing, and operating the system. The DIGESTS of the three years of most tremendous growth, 1957 through 1959, were taken and rearranged for those three years so that all the articles would be grouped together in the logical sequence described above. In addition to those mentioned, a section on the management sciences, including operations research, artificial intelligence, and the whole field of documentation and machine linguistics was added. Another section is devoted to specific applications of EDP equipment. There is a section on the educational and sociological implications of EDP, and finally, a large section on reference materials.

The EDP IDEA FINDER is bound into one large 650-page volume, a complete reference library, arranged for the most logical kind of use. The 12 issues of 1960 DPD have been indexed in the same logical manner, giving the researcher the advantage of an up-to-date IDEA FINDER. Subsequent years will be indexed in like manner. Probably a second volume will be published to put 1960 through 1962 into the same single volume IDEA FINDER format.

CANNING, SISSON AND ASSOCIATES, INC., seems to be the only organization which has made a study of the physical installation problem, and published information of practical use to companies about to go into this phase of EDP. CUTTING THE COST OF YOUR EDP INSTALLATION and its SUPPLEMENT, which is concerned with the installation problems of transistor machines and fire prevention, is a manual containing detachable work sheets which may be used to evaluate physical sites, plan for the construction, air conditioning, electrical wiring, storage, and other requirements. Procedures for planning the site, suggested time schedules, administrative organization, and costs are given. Case studies of representative installations show how successful EDP organizations have been set up.

At the present time, this is the extent of the company's activity, except for the management decision games which are being marketed to accompany the book DYNAMIC MANAGEMENT DECISION GAMES by Roger L. Sisson and Jay R. Greene, published by John Wiley & Sons, Inc. These games are described in the book, and may be played without the use of a computer. Because of this, they are very appropriate for use in limited -budget business courses which are exploring the new simulation techniques available to management. The games include marketing, inventory and production control and personnel assignment, as well as top management decision making. The game kits contain enough materials for several sessions and up to 25 players.

Any of these publications may be ordered from Canning, Sisson and Associates, Inc., 1140 South Robertson Boulevard, Los Angeles 35, California. Prices are: DPD, $24 per year; IDEA FINDER, $69 (includes 1960 DPD); CUTTING THE COST OF YOUR EDP INSTALLATION (including SUPPLEMENT), $55; DYNAMIC MANAGEMENT DECISION GAMES, Book, $2.95; game kits, $25.

- Contributed by Margaret Milligan, General Manager,
Canning, Sisson and Associates, Inc., and
Editor, SABE DATA PROCESSOR

Books

Esther R. Becker and Eugene F. Murphy, THE OFFICE IN TRANSITION. Harper & Bros., 1957, $3.50.

Charles D. Flagle and others, editor, OPERATIONS RESEARCH AND SYSTEMS ENGINEERING. John Hopkins Press, $14.50.

George Kozmetsky and Paul Kircher, ELECTRONIC COMPUTERS AND MANAGEMENT CONTROL. McGraw-Hill.

David Miller and Martin K. Starr, EXECUTIVE DECISIONS AND OPERATIONS RESEARCH. Prentice-Hall, $10.

John A. Postley, COMPUTERS AND PEOPLE. McGraw-Hill, $6.

Martin H. Weik, A SECOND SURVEY OF DOMESTIC ELECTRONIC DIGITAL COMPUTING SYSTEMS. U. S. Department of Commerce, Office of Technical Services, $7.

Articles

In this section of our Automation Reference and Research we are attempting to list the most interesting and useful of the many hundreds of magazine articles on automation which are being written continuously. Please help by sending in listings which have been useful to you. R. Stanley Merrill sent in many of the listings used in this issue.

Automation and the longshoremen, ATLANTIC. December 1960, p. 57.

Computers start to run the plants, BUSINESS WEEK. 11/5/60, p. 50.

The Impact of Automation on the Office Manager, listed in "Abstracts of Papers" of OFFICE EXECUTIVE, November 1960, p. 56.

Why computers take up games, BUSINESS WEEK. 11/26/60.

Wizards of Automation, in YOUR FUTURE OCCUPATION, 12/12/60. Address of YOUR FUTURE OCCUPATION is: P. O. Box 7408, Washington 4, D. C. You may also want to write to American Society of Tool Engineers, 10700 Puritan Avenue, Detroit 38, Michigan, for a copy of the pamphlet, ADVENTURE INTO TOMORROW, from which the information on the subject of automation was taken for YOUR FUTURE OCCUPATION.

Jane E. Clem, The influence of automation on the teaching of typewriting, BUSINESS EDUCATION FORUM, 14:22, April 1960.

Nicholas J. Cornelia, An analysis of machine bookkeeping, JOURNAL OF BUSINESS EDUCATION, in 3 parts: January, February, and March 1958.

E. Friedlander, The training of audio-typists, INTERNATIONAL REVIEW FOR BUSINESS EDUCATION, April 1960, p. 69.

E. Dana Gibson, Automation: a selected bibliography, BUSINESS EDUCATION WORLD, 38:31, September 1957.

E. Dana Gibson, Automation and business education, BUSINESS EDUCATION FORUM, 14:11, January 1960.

Enoch J. Haga, Implications of electronic data processing for business education in high school, COMPUTERS AND AUTOMATION, 7:24, September 1958.

OF INTEREST TO TEACHERS

In this section of the SABE DATA PROCESSOR are found audio-visual aids, items on automated teaching, news of automation and the curriculum, glossary of automation terms, and other items of special interest to teachers. Please help by sending in material.

Weekly Lectures for Business Machines Classes

In this issue we continue the series contributed by Dr. E. Dana Gibson, Professor of Office Management, San Diego State College, San Diego 15, California. For this lecture, see your local Burroughs or Comptometer agencies for additional information.

3. Pegboard-Key Driven Systems Relationships

1. Pegboards and key-driven machines have, for some time, been working together profitably in systems operations.

2. Pegboards are flat surfaces (wood or metal or plastic) which have pegs spaced down one or more sides to hold sheets in a pre-determined position or positions.

   a. These pegs may be movable or fixed.
   b. The pegboards may be small or large (2' x 3') in size.
   c. Additional accessories, like T-squares, may be purchased to facilitate work being done.

3. "One-Shot Writing" is the principle behind the use of pegboards; i.e., by carbon sheets and properly designed forms shingled one over the other, one writing can be made to accomplish the work of several writings. One writing makes possible:

   a. Reducing error because one writing does for two, three, or more writings. Each additional writing provides an opportunity for error.
   b. Speeding up an operation because it takes time to do the additional writing if two, three, or more writings are involved.
   c. Reducing effort because worker does not have to copy the same information several times.
   d. Speeding up work flow by doing more than one form at one time.
   e. Reducing cost because no one has to be paid for the time saved by writing several forms in one writing. Also, pegboards are relatively inexpensive.
   f. Increasing the quality of proofreading done because more time and effort can be spent in finding errors since only one writing needs proofreading instead of two, three, or more writings.

4. Any business can make profitable use of pegboard systems—large, medium, or small size—as not all of them have enough items to be handled in a repetitive manner to justify doing that work on a machine, and almost any kind of work involving more than one form in an operation can be put on pegboards. For example,

   a. Payroll jobs.
   b. Accounts payable jobs.
   c. Accounts receivable jobs.
   d. Inventory jobs.
   e. Order systems.
   f. Financial statements.

5. The forms must be designed to do the following things:

   a. Matching forms must have the same information in the same places on all of them in exactly the same size or space.
   b. Carbon on the back of the form, or as a separate sheet, must supply the transfer of data from one form to another. The less carbon that is needed or the less a carbon sheet must be handled (no carbon sheet is preferable) the better.
   c. Forms must be capable of being overlapped (shingled) so that only a required edge is available for use at any one time.
   d. Printed data should reduce the work of filling out a form to the minimum.

e. Overlapping edges that can be lined up for adding or calculating increase the effectiveness of a series of forms.

f. Folds can be used to make possible greater use of all the available space on a form, but these folds must be resistant to folding and match exactly the spaces to be filled out on all forms involved.

g. Summary forms should be constructed so that a composite of all data, where possible, can be quickly and easily obtained.

6. Key-driven calculators are particularly adapted to pegboard systems because:

a. Most of the figures involved are one, two, or three digits.

b. The two most common arithmetic calculations desired are additions (adding up columns or across columns) or multiplications (extending invoices, etc.). Touch addition makes possible fast, accurate, and easy addition. Small digit multiplication is limited in speed by the skill and speed of the operator's hand(s).

c. Insertion automatically supplies the answer in the dials. No plus bar or other motor bar or key needs to be depressed, saving the time and energy of this operation.

7. Special designs of pegboards and forms make possible quick, accurate, up-to-date work in many small offices; such as those of doctors, dentists, optometrists, etc.

8. Case Study--Taken from Comptometer material supplied by local manager.

One of the nice features of the pegboard system is that (as is often the case) by proper use of totals the accuracy of the work done can be proved. From summary strips, it is easy to arrive at Profit and Loss Statements or Balance Sheet statements. In addition to summary strips, the journal sheets involved often are used for similar purposes.

Using journal strips, the net figures are obtained by cross addition and cross subtraction, as needed. In the case of the assets, the subtraction will be the credits from the debits, although in the case of the liabilities, the debits are subtracted from the credits. Square (or grand total) balancing of all statements proves the accuracy of the work done. Weekly statements are shingled on the pegboard and cross-added to obtain the monthly or year-to-date statements. As the Comptometer manual says, the advantages of this plan are:

1. It can be used in any business--size makes no difference--and one person, or many persons, can be employed to do the work necessary.

2. It can be quickly and economically installed and operated. Daily, weekly, or other forms can be prepared, thus reducing accounting work to a minimum with a high degree of accuracy.

3. Final figures are promptly available.

4. It prevents peak loads and closing periods, as figures are always available and up-to-date.

5. The figures shown are a record of the original transaction. No duplication or recopying is necessary.

The local Comptometer manager said that pegged forms could be prepared with different hole spacing and showed two of them--3/4 inch and 1 inch centers (some boards have 5/8 inch and/or 1¼ inch centers)--over which 3/8 inch and ½ inch holed forms could be shingled, making for a variety of overlapping. He also illustrated how, using a special bar, forms with no pegged holes could be shingled and used with spacing to suit the need. Another feature discussed was the masking process. By cutting several large holes at strategic spots in a card, and shingling this card over the forms on pegboards, only the desired data at any time could be singled out for use. Other data would be hidden behind the mask until moved to a new shingled position.

Automation and the Curriculum

We present here a list of course offerings in Business Data Processing at California state colleges. The list, dated January 10, 1961, was prepared by R. C. Van Wagenen, Chief, Bureau of Business Education, California Department of Education, Sacramento 14, California

San Fernando Valley State College, Northridge:

Bus. 494	Electronic Data Processing	Spring 1961	Day	Evening
Bus. 495	Electronic Programming	Spring 1961	Day	Evening

Fresno State College

Bus. 160	Automation and Data Processing	Spring 1961	Evening
Bus. 161	Principles of Operations Research	Spring 1961	
	Workshop in Automation and Data Processing for Teachers	Post-session 1961	

San Jose State College

Bus. 168	Business Data Processing	Spring 1961 Summer Session 1961

San Diego State College

Bus. 185	Office Systems and Automation	Spring 1961 Summer Session 1961

Sacramento State College

B.A. 101	Introduction to Electronic Data Processing Systems	Fall 1961
B.A. 102	Planning Computer Applications	Spring 1961

San Francisco State College

Bus. 123	Introduction to Data Processing	Spring 1961	Day	Evening
Bus. 123.1	Data Processing: Unit Record Management	Spring 1961 Summer Session		Evening

Stanislaus State College, Turlock

Bus. 4231	Systems and Procedures Analysis	Spring 1961

Alameda County State College, Hayward

Digital Computer Programming	Summer 1961

For further information write directly to the state colleges.

Glossary of Automation Terms

Please help the Editors compile a useful list of terms and terminology in the field of automation; send in lists with carefully thought out definitions. We do not want copies of glossaries that are already in print; we do want new terms and phrases and simple definitions likely to be of interest to our members.

AUDIO-TYPIST--a typist who types by ear rather than by sight; a recording of some sort is usually the source of the data typed.

AUTOMATION--1. a term first used by a vice-president of the Ford Motor Company, Delmar S. Harder, to describe the automatic movement of automobile parts from one metal-working machine to another; 2. a term invented by a management consultant, John Diebold; 3. a term used to describe fully automatic machines having the capacity to correct their own instructions based on reports of past performance; 4. a general term referring to all automatic machines and processes; 5. a term referring to the conversion of manual tasks to semi- or fully automatic processes.

BUSINESS AUTOMATION—a term referring to all automatic or semi-automatic equipment and processes found in a business office; this term is used in contrast to INDUSTRIAL AUTOMATION.

INDUSTRIAL AUTOMATION—a term referring to all automatic or semi-automatic equipment and processes found in industry; this term is used in contrast to BUSINESS or OFFICE AUTOMATION.

OFFICE AUTOMATION—same as BUSINESS AUTOMATION.

OPSEARCHER—one who is engaged in operations research.

SABE Is YOUR Business

If Business Education is to be Better, teachers need to face-up to and think about some new ideas. The following guide sheet sent in by Dr. E. Dana Gibson of San Diego State College should give us something to think about. Send us your New Ideas.

Automation and Its Impact on Secretarial Work

The secretary will not be replaced by automation but will be drastically affected by the changes it brings. The stenographer may not be so lucky, particularly as machine transcription on data capturing machines takes place. As a guide line for yourself, see how many of the following questions you can answer:

1. Can you define the following concepts that every secretary or stenographer should know: (These are but a few of the many that could be listed). When you find good definitions, why not send them in for publication in the Glossary—be sure that they are carefully thought out and in your own words:

   Data processing—computer systems—data processing systems—systems—operations research—common-language media—integrated data processing—electronic data processing—programming—COBOL—Flexowriter—business vs. scientific computer systems—solid state computer—coder

2. How will the new data processing systems affect the work of the secretary or stenographer?

3. What new machines are the secretarial and stenographic worker likely to encounter?

4. What kind of work is each of the following likely to be doing soon?

   Typist—file clerk—stenographer—secretary—machine operator

5. What kind of training should business graduates have at the following levels?

   High school—junior college—college and university, graduate and undergraduate

6. How can business teachers provide their students with the kind of knowledge they need about automation?

7. What training is available to business teachers by which they can obtain the automation knowledge they need?

Special Announcements

A number of persons have consented to serve on the SABE Advisory Board for the school year 1961-1962. As soon as notices of acceptance are received from all persons names will be released. See the last issue of the SABE DATA PROCESSOR for other details.

Margaret Milligan of DATA PROCESSING DIGEST has consented to serve on the SABE Editorial Committee. We welcome the addition of Margaret Milligan to our Editorial Staff (see our WORTH READING—Services department in this issue).

David J. Waterman, Jr., Instructor in Psychology, Modesto Junior College, Modesto, California, has joined our staff as Honorary Vice-President and Contributing Editor. Mr. Waterman will conduct the Automated Teaching department of the SABE DATA PROCESSOR.

Mrs. Lucille Meyers, a business teacher at Lennox High School, Inglewood 2, California, is also interested in teaching machines. Between Mr. Waterman and Mrs. Meyers we should have many good ideas on the subject to pass on to you.

The following people have generously consented to serve on the SABE Advisory Board for the school year 1961-1962:

1. Sister M. Alexius, Edgewood College of the Sacred Heart, Madison, Wisconsin.
2. Dr. Clyde Blanchard, 1731 S. Knoxville, Tulsa 12, Oklahoma.
3. Dr. Eugene H. Hughes, Dean, College of Business Administration, Houston University, Houston, Texas.
4. Mr. John K. Swearingen, General Electric Company, Appliance Park, Louisville, Kentucky.
5. Mr. Jack Tauber, Systems Analyst, Remington Rand Univac, Philadelphia, Pennsylvania.

Other details concerning the SABE Advisory Board, its functions and duties, will be announced later. This fine group of experienced people are a welcome addition to the SABE organization.

Los Angeles State College now has a computing center in operation. After considerable efforts by faculty, administration, and technical staff, an IBM 650 digital computer with peripheral equipment was obtained. This is an all-campus facility, administered by Charles L. Clark, Head, Mathematics Department, as director; Clark is aided by Leonard Hein, Business & Economics, and Philip Silver, Engineering. The three men work together as a policy committee of three. During the next few weeks there will be a series of open house demonstrations to which different divisions of the campus will be invited so as to indicate to faculty how they might utilize the computer for instruction and research.

Meetings Worth Attending

By the time you receive this issue, the first meeting of SABE will be history. The meeting was held March 27, 1961 in San Diego, California in conjunction with the California Business Education Association. Details and information about outcomes will be forthcoming. No decisions were made that become final before submission to the entire membership.

June 28-30, 1961. The annual meeting of the National Machine Accountants Association. Write to Mr. William F. Mauk, 1700 W. Central Road, Mt. Prospect, Illinois.

What Others Are Doing

A number of members have generously sent us news items and other materials. Thank you and please continue. Lack of space is the only thing preventing immediate use of this material. As space allows, much of this material will be used. Thank you again for your time and effort and support.

Automated Teaching

Conducted by David J. Waterman, Jr., Instructor in Psychology, Modesto Junior College, Modesto, California. Mr. Waterman would like to be kept informed of all developments in the field. Please help to make SABE a clearing house for information on automated teaching. In this issue Mr. Waterman presents some reference listings which are especially valuable in that most of the items are relatively easy to obtain. Later issues will feature short articles by Mr. Waterman on various phases of the subject. Included this month is other valuable material on automated teaching contributed by Mrs. Rosemary P. Gibson, wife of our President, Dr. E. Dana Gibson of San Diego State College.

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Teaching Devices and Programs for Automated Learning.

1. ASTRA Corporation. 31 Church St., New London, Connecticut.

   Name: Autoscore.

   Price: $150.00 each.

   Programs: Programs available in spelling, word meaning, and arithmetic facts. Others can be developed rapidly upon request.

2. DYNA-SLIDE Company. 600 S.Michigan Ave., Chicago 5, Illinois.

   Name: Dyna-Slide PROGRAM SCANNER.

   Price: $39.50 each.

3. FORINGER and Co., Inc., P.O.Box 5882, B ethesda 14, Maryland.

   Name: Foringer Teaching Machine, Cat. #_2002.

   Price: $80.00 each.

4. GENERAL ATRONICS Corporation. 1 Bala Ave., Bala Cynwyd,Pa.

   Name: Atronic Tutor.

   Price: $150.00. each.

   Program: Russian Vocabulary Text- can be purchased separately for $25.00

5. HAMILTON RESEARCH ASSOCIATES, Inc., 4 Genesee St., New Hartford,N.Y.

   Names: Visitutor Prices: Approximately $300.00

* (Not listed in large Reference section).

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* Fry,E.B., Bryan,G.L., & Kinney,J.M. (Eds.) Teaching Machines: An Annotated Bibliography. Washington,D.C.: Dept. of Audio-Visual Instruction, National Education Association, 1960. $1.50

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2. LYNN-SLIDE Company. 600 S.Michigan Ave., Chicago 5, Illinois.

Name: Lynn-Slide PROGRAM SCANNER.

Price: $39.50 each.

3. PORTMORE and Co., Inc., P.O.Box 5882, N Attleboro 14, Maryland.

Name: Portmore Teaching Machine, Cat. # 2002.

Price: $50.00 each.

4. GENERAL ATRONICS Corporation. 1 Main Ave., Elk Grove,Pa.

Name: Atronic Tutor.

Price: $150.00. each.

Program: Russian Vocabulary Texts can be purchased separately for $25.00

5. HAMILTON RESEARCH ASSOCIATES, Inc., 4 Geneses St., New Hartford,N.Y.

Names: Validator Prices: Approximately $300.00

* (Not listed in large Reference section).

5. HAMILTON RESEARCH ASSOCIATES, Inc., 4 Genesee St., New Hartford,N.Y.

   Names: Auditutor. Price: Approximately $500.00

   Visitutor-Card Model 89.50

6. HOLLYWOOD ACCESSORIES Co., 1612 W.Washington Blvd., Los Angeles, 7, Calif.

   Name: EZE-ANSWER Sheet.

   Price: $40.00 per thousand sheets. Setting up a new form- $30.00 maximum.

7. MANAGEMENT RESEARCH ASSOCIATES. 14 Hill Drive, Dune Acres, Chesterton, Indiana.

   Name: X-O Form of the Self-Trainer.

   Price: 10-item Self-Trainer - $7.50 per hundred sheets.
   25-item Self-Trainer - 12.00 per hundred sheets.

8. RHEEM CALIFONE CORPORATION. 1020 North La Brea Ave., Hollywood,Calif.

   Name: Automated Teaching Didak 501.

   Price: $157.50 each.

9. TEACHING MACHINES, Inc., 235 San Pedro,N.E., Albuquerque, New Mexico.

   Names: Min/Max. Prices: $ 20.00

   Wyckoff Film Tutor. 445.00

   Programmed Textbook. 15.00 -500 page program.

   OMNIDECK Cards. 15.00 - per complete program.

   Programs: Descriptive Statistics.
   Statistical Inference.
   Fundamentals of Music.
   Fundamentals of Spelling.
   Fundamentals of Algebra.
   Fundamentals of Electricity.
   Multiplication and Division Facts.
   Basic Hebrew Reading.
   Basic Russian Reading.

10. VAN VALKENBURGH,NOOGER & NEVILLE,Inc., 15 Maiden Lane,N.Y.,38,N.Y.

    Name: Trainer-Tester, Form D.

    Price: Prices upon request.

11. WESTERN DESIGN. Division of U.S.Industries,Inc., Santa Barbara Airport, Goleta,California.

    Name: AutoTutor. Model 723-001-2 Basic Tutor.

Automatic Teaching. Reference. Nutronan.

5. HAMILTON RESEARCH ASSOCIATES, Inc., 4 Geneese St., New Hartford,N.Y.

Names: Auditutor. Price: Approximately $500.00

Visitutor-Card Model $9.50

6. HOLLYWOOD ACCESSORIES Co., 1402 W.Washington Blvd., Los Angeles, 7, Calif.

Name: EYE-AWEMA Sheet.

Price: $40.00 per thousand sheets. Setting up a new form- $30.00 maximum.

7. MANAGEMENT RESEARCH ASSOCIATES. 14 Mill Drive, Dune Acres, Chesterton, Indiana.

Name: A-C Form of the Self-Trainer.

Price: 10-item Self-Trainer - $7.50 per hundred sheets.
25-item Self-Trainer - 12.00 per hundred sheets.

8. RUBEN CALIFONE CORPORATION. 1020 North La Brea Ave., Hollywood,Calif.

Name: Automated Teaching Disk 501.

Price: $137.50 each.

9. TEACHING MACHINES, Inc., 235 San Pedro,N.E., Albuquerque, New Mexico.

Names: Mark Ten. Prices: $ 20.00

Wrapoff Film Tutor. 445.00

Programmed Textbook. 15.00 -500 page program.

COMPUTRON Optic. 15.00 - per complete program.

Programs: Descriptive Statistics.
Statistical Inference.
Fundamentals of Music.
Fundamentals of Spelling.
Fundamentals of Algebra.
Fundamentals of Electricity.
Multiplication and Division Facts.
Basic Money Reading.
Basic Reading Reading.

10. VAN VALKENBURGH,NOOREN & VILLE,Inc., 15 Maiden Lane,N.Y.,38,N.Y.

Name: Trainex-Tester. Form D.

Prices: Prices upon request.

11. WESTERN PRSION. Division of U.S.Industries,Inc., Santa Barbara Airport, Goleta,California.

Name: AutoTutor. Model 723-out-2 Basic Tutor.

11. WESTERN DIVISION. Division of U.S.Industries,Inc., Santa Barbara Airport, Goleta,California.

Price: $3,733- $4,975.

Programs: First TutorTexts to be published this fall include:

Book on contract bridge by Charles Goren.
Instructional material in algebra,trigonometry, electronics, and number systems.

Future Doubleday TutorTests will range from basic science to business and industrial subjects and popular games.

Automatic Teaching. References. Waterman.

11. WESTERN DIVISION. Division of G.S.Industries,Inc., Santa Barbara
Airport, Goleta,California.

Price: $3,723- $4,975.

Programs: First TutorTexts to be published this fall include:

Book on contract bridge by Charles Goren.
Instructional material in algebra,trigonometry, electronics,
and number systems.

Future foundation TutorTexts will range from basic sciences to
business and industrial subjects and popular games.

TEACHING MACHINES OUTLINE

DEFINITION: Actually, the application of "modern hardware" to the Socratic, or tutorial, method of instruction.

PREDICTION: Skinner and others in contact with industry foresee mass production and wide use of teaching machines within five years. Specialists calculate that schools will need one machine or programmed text for about every three students, and that automatic instruction will occupy between a fifth and a third of each school day.

IMPLICATIONS FOR BUSINESS EDUCATION: This technique lends itself to factual material; but not (at least as yet) to creative areas. In Business Education, such subjects as Bookkeeping, Salesmanship, Business Law, Shorthand, Business English, Economics, Consumer Education, and General Business, could well profit by such programming and instruction.

PIONEER RESEARCH: The first modern teaching machine was invented in the early 1920's by Professor S. L. Pressey of Ohio State University. Its potentialities were largely ignored by educators until 1954, when Dr. B. F. Skinner, Professor of Psychology at Harvard, threw his prestige behind the idea.

CURRENT MODELS: There are three different types from the point of view of programming, with numerous varieties of each basic type:

1. Selective Answer Approach (oldest)--the type developed by Pressey in 1926. Automatic testing device; presents a question with multiple choice answers. Student makes a choice. If right, machine moves on; if wrong, he tries until correct.

2. Constructive Answer Approach: (Developed by B. F. Skinner in 1954). Students compose or construct answers to questions or problems and write answers in place provided.

3. Branching Approach: (Developed by N. A. Crowder). Here, the student's choice of answer will determine the material he sees next. The Scramble Book is a variation of this approach.

Specific Models and Prices: (In general, prices range from $20 to as high as $6,550 per machine.)

1. The Teaching Machine--The Grolier Society, Inc., 575 Lexington Avenue, New York; price--$79.50, including four programs; each additional program, $9.50.

2. Auto-Tutor, an advanced electronic teaching machine developed by Western Design, a division of U. S. Industries, Inc., Santa Barbara; it is about four feet high, two feet wide, and three feet deep. Unit price ranges from $2,836 to $4,975, depending on quantity and accessories.

3. The Rheem California Corporation's Automatic Teaching Didak 501--Price, $157.50; address--1020 North LaBrea Ave., Hollywood 38.

KEY IDEA: The important thing is not the hardware, but the pyschology involved--breaking learning down into logical, sequential bits that the student can master step by step. Based on the educational psychology principles of active, not passive learning, reward, and progression of minute steps.

ADVANTAGES:
(1) Quality control of subject matter
(2) Continuous student activity
(3) Immediate correction of errors
(4) Pacing consistent with student's learning capacity
(5) Standardization of levels of achievement
(6) Bonus of time for the teacher to be applied to individual direction
(7) Continuous testing of student progress

DISADVANTAGES:
(1) Problem of motivation at school level, as opposed to use in job training situations, where salary or promotion depend on mastery of material
(2) Expense
(3) Scarcity of programmed materials as yet
(4) Requires much self-discipline for success--advantage or disadvantage, depending upon quality of student

PRESENT USES: Predominantly for research studies, in education. In business, industry, and armed forces, increasing use for automatic training on the job. For example, at Keesler Field, a complete training course in basic electronics is given by machine, with no instructor present.

Experiments in the educational field: Basic studies at Ohio State University; Harvard; Santa Barbara (U. S. Industries, Inc.); U. S. C. (under Dr. James D. Finn); University of Pennsylvania (Dean William Arnold); Collegiate School for Boys in New York City; R. E. Corrigan and Associates, Riverside, California; Oberlin College; Earlham; Hamilton College; Columbia University.

PROGRAMS: Program writing is still difficult, time consuming, and expensive. It is estimated that a year's arithmetic program will cost upward of $50,000 to prepare--exclusive of printing and paper. Professor Skinner's psychology program, developed and revised over several years on grant funds, is the first to be offered for sale--it is being used in Java, Lebanon, and the Philippines, as well as in

this country--but the charge of $15 a copy pays only for reproduction and handling. This fall, Harcourt Brace will offer a scientific program in English grammar and usage, and Doubleday will publish four programs--introductory algebra, bridge playing, electronics, and computer arithmetic.

Business and industry (concerned with unit costs) estimate that a programmer should be able to produce ten pages of material a day; experts in the field claim that two pages a day is a good average, if the work is properly done.

Doubleday also has texts known as "Scramble Books," a method which poses a question on each page and offers a choice of answer, each accompanied by a page reference.

All these will cost between $3 and $5 a copy.

There are now not more than a dozen complete programs in the entire country, even for experimental use. U. S. C. is developing a library of programmed material, and already has about 90 different programs representing a variety of fields.

While business and industry like to hold to a standard of 10 pages of material a day put out by programmers, a more realistic average, it is thought, would be about two pages a day.

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   d. "California Steps Out With Teaching Machines," by Edward Fry, page 15.
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5. "Automated Teaching Methods: A Solution to Our Education Problems," by Robert E. Corrigan. Presented at the Annual Meeting of the A-V Education Association of California, at the Caravan Inn, Riverside, California, October 23-4, 1959.
6. AUTOMATED TEACHING: THE STATE OF THE ART, Edited by Eugene Galanter. John Wiley and Sons, 1959.

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